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ABSTRACT

This brief document reports on Federal support to individual universities and colleges both for science/engineering (S/E) and non-S/E activities. The study, the only source of data on total Federal obligations to individual academic and nonprofit institutions, is carried out annually by the National Science Foundation (NSF), as a result of a congressional mandate to do so. The data are based on a survey of the 15 Federal Agencies with the largest programs supporting S/E activities, and account for about 95 percent of all Federal obligations to universities and colleges in fiscal year 1980. Support increased by 9 percent between 1979 and 1980, which meant 1 percent in real dollars. Further, the greatest increase in research and development (R&D) funds between 1971 and 1980 occurred in life sciences, the smallest in psychology. This report contains detailed information on several aspects of Federal support, including a table listing Federal obligations to 100 universities and colleges receiving the largest amounts in fiscal year 1980. (MP)

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SCIENCE RESOURCES STUDIES HIGHLIGHTS

NATIONAL SCIENCE FOUNDATION WASHINGTON, D.C. 20550 MARCH 29, 1982 NSF 82-301

1980 Federal Obligations to Universities and Colleges Rose Slightly in Constant Dollars

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By congressional mandate, the National Science Foundation (NSF) annually collects and analyzes data on Federal support to individual universities and colleges both for science/engineering (S/E) and non-S/E activities. The study is the only source of data on total Federal obligations to individual academic and nonprofit institutions. The survey is completed by the 15 Federal agencies with the largest programs supporting academic S/E activities. Obligations data are compiled and analyzed on six separate categories of academic S/E activity, the largest component being research and development. The responding agencies accounted for over 99 percent of all Federal academic R&D obligations and about 95 percent of all Federal obligations to universities and colleges for all purposes in FY 1980. Data presented are in terms of current dollars except where specified as constant 1972 dollars, which are based on the gross national product (GNP) implicit price deflator.

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Highlights

• Support from Federal agencies to universities and colleges for both S/E and non-S/E programs grew by 9 percent between 1979 and 1980 (1 percent in real dollars) to a new high of $8.3 billion.[1] The average annual growth rate was considerably higher between 1975 and 1979—14 percent, or 6 percent in real terms.

• Federal obligations for academic S/E activities increased by 8 percent, primarily because of an 8-percent increase of its largest component—research and development. When the effects of inflation were taken into account, however, these activities actually fell by about one-half of 1 percent each, the first indication of a real-dollar decline in four to five years. Federal support of research and development at universities and colleges in constant-dollar terms continued to decline in 1981 at an even higher rate—4 percent.[2]

• Between 1979 and 1980, Federal support for all "other" S/E activities rose by 6 percent—in real terms a drop of 2 percent. These activities include funds for fellowships, traineeships, and training grants; facilities and equipment for instruction; general support for science/engineering; and other S/E activities. Support for fellows and trainees ($223 million) and for other S/E activities ($287 million) accounted for all of the 1979-80 increase.

• Between 1971 and 1980, Federal funds for academic R&D activity have grown by 45 percent in terms of 1972 dollars, while support for R&D plant has declined by 32 percent. Funds for all "other" S/E activities have declined by 55 percent in the same period.

• Among the major S/E fields, the greatest increase in R&D funding between 1971 (the first year that S/E data by field were available) and 1980 occurred in the life sciences (up 290 percent) while psychology (52 percent) showed the smallest relative increase.

• Federal funding for academic R&D plant grew by 18 percent between 1979 and 1980, or 9 percent in 1972 dollars. The $38 million devoted to R&D plant in 1980 represented only 13 percent of the 1965 peak in funding levels in real-dollar terms.

Total Federal Support

Obligations by Federal agencies for both S/E and non-S/E activities at universities and colleges rose to $8.3 billion in 1980, 9 percent greater than the amount obligated in 1979 (1 percent larger in constant dollars) (table 1).[3]

The leading 20 recipients of Federal support, except for Howard University, were also among the top-ranked academic R&D performers. Howard University ranked second in total funding but nearly all of its funding is appropriated by Congress

Table 1. Federal obligations to universities and colleges by type of activity: FY 1975-80

[Dollars in millions]

Type of activity	1975	1976	1977	1978	1979	1980
Total	$4,547	$5,403	$6,490	$7,472	$7,604	$8,320
Academic science/engineering	2,806	2,960	3,351	3,960	4,473	4,825
Research and development	2,239	2,423	2,789	3,364	3,847	4,155
R&D plant	45	24	36	34	32	38
"Other" science/engineering activities, Total	521	512	527	562	593	632
Facilities and equipment for instruction	12	11	18	27	33	30
Fellowships, traineeships, and training grants	201	175	185	206	205	223
General support for science/engineering	46	74	76	74	92	92
Other science/engineering activities	262	252	248	255	263	287
Nonscience	1,741	2,443	3,138	3,512	3,131	3,495

Source: National Science Foundation

(Prepared in the Universities and Nonprofit Institutions Studies Group, Division of Science Resources Studies)

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for general operating expenses. Johns Hopkins University, with a total of $261 million, continued to be the leading recipient of Federal funding. Massachusetts Institute of Technology (MIT) ranked third. The ten leading recipients in 1980 were the same as in 1979 with minor variations in rank (table 2).

Table 2. Federal obligations to the 100 universities and colleges receiving the largest amounts: FY 1980[1]

[Dollars in thousands]

Rank	Institution	Total, all activities	Research and development	R&D rank
	Total, all institutions	$8,319,815	$4,155,366	
1	Johns Hopkins Univ[2]	260,977	239,869	1
2	Howard Univ[4]	166,146	7,144	124
3	Mass Inst of Technology	163,206	141,011	2
4	Univ of Washington	131,261	100,567	4
5	Stanford Univ	122,223	104,539	3
6	Univ of Cal-Los Angeles	118,908	87,073	6
7	Univ of Minnesota	115,750	74,739	11
8	Univ of Wis-Madison	109,988	80,460	9
9	Harvard Univ	109,038	83,997	7
10	Univ of Cal-San Diego	103,043	90,703	5
Total 1st 10 institutions		1,400,540	1,010,102	
11	Univ of Michigan	100,164	71,204	12
12	Columbia Univ-Main Div	99,213	81,361	8
13	Cornell Univ	97,944	74,761	10
14	Univ of Pennsylvania	89,176	70,843	13
15	Yale Univ	87,060	67,970	14
16	Pennsylvania State Univ[3]	85,774	48,279	20
17	Univ of Cal-San Francisco	80,023	62,581	15
18	Univ of Cal-Berkeley	70,343	49,943	19
19	Univ of Ill-Urbana	68,562	50,332	18
20	Univ of Colorado	66,134	44,460	22
Total 1st 20 institutions		2,244,933	1,631,836	
21	Ohio State Univ	64,952	37,034	30
22	Washington Univ	63,340	52,512	16
23	Univ of Chicago	62,706	50,592	17
24	Univ of Southern Cal	62,208	48,198	21
25	Univ of NC at Chapel Hill	61,373	41,850	25
26	New York Univ	60,491	39,494	29
27	Michigan State Univ	59,168	28,777	41
28	Univ of Pittsburgh	57,260	33,181	35
29	Gallaudet College[4]	57,135	148	371
30	Duke University	54,047	42,531	23
Total 1st 30 institutions		2,847,613	2,006,153	
31	Purdue Univ	53,083	36,487	31
32	Univ of Rochester	52,182	40,992	26
33	Univ of Cal-Davis	50,109	42,111	24
34	Univ of Texas at Austin	49,502	40,223	28
35	Yeshiva Univ	48,423	40,252	27
36	Indiana Univ	48,333	26,334	47
37	Univ of Arizona	48,059	33,283	34
38	Univ of Iowa	47,232	34,598	32
39	Univ of Miami	46,381	27,986	42
40	Univ of Utah	42,874	31,828	36
Total 1st 40 institutions		3,333,791	2,360,247	
41	Univ of Florida	42,642	25,134	49
42	Northwestern Univ	41,638	31,722	38
43	Case Western Reserve Univ	40,620	31,399	39
44	Texas A&M Univ	40,023	26,924	44
45	Univ Alabama-Birmingham	39,528	26,835	45
46	Boston Univ	38,544	24,909	50
47	California Inst of Tech	38,358	34,493	33
48	Oregon State Univ	37,829	29,577	40
49	Univ of Cincinnati	37,230	19,422	64
50	Univ of Md College Park	36,482	26,367	46
Total 1st 50 institutions		3,726,685	2,637,029	
51	U Tennessee-Knoxville	36,265	20,572	61
52	Univ of Kentucky	35,481	13,933	84
53	Baylor Col of Medicine	35,071	31,784	37
54	Inter Am UPR-San German	33,824	0	—
55	Univ of Mass at Amherst	33,757	14,146	83
56	Univ of Missouri Columbia	33,157	16,380	75
57	Vanderbilt Univ	33,099	25,928	48
58	Louisiana State Univ	32,621	19,100	65
59	Univ of Kansas	32,598	21,718	59
60	Univ of Virginia	32,367	23,284	54
Total 1st 60 institutions		4,064,925	2,823,874	
61	Univ of New Mexico	32,158	17,862	71
62	Rutgers the St Univ of NJ	32,115	16,130	76
63	Univ of Hawaii-Manoa	31,935	23,677	52
64	Univ of Connecticut	31,909	18,911	66
65	Temple University	31,891	15,217	82
66	Colorado State Univ	31,646	21,926	56
67	Georgia Institute of Tech	31,229	27,833	43
68	NC State Univ at Raleigh	29,280	16,059	77
69	U Tex Hlth Sci Ctr-Dallas	28,665	22,172	55
70	Va Polytech Inst & St U	27,037	16,711	74
Total 1st 70 institutions		4,372,790	3,020,372	
71	Princeton Univ	26,795	21,423	60
72	Univ of Georgia	26,712	16,885	73
73	Carnegie Mellon Univ	26,701	21,861	57
74	Univ of Ill Med Ctr Chgo	26,116	12,017	90
75	Cuny Mt Sinai Sch of Med	25,880	21,799	58
76	Albany State College	25,534	24,024	51
77	Univ of Md-Balt Prof Sch	24,811	17,171	72
78	Univ of Cal-Irvine	24,664	18,426	67
79	Virginia Commonwlth Univ	24,616	15,575	79
80	Woods Hole Oceanographic Inst	24,171	23,415	53
Total 1st 80 institutions		4,628,790	3,212,968	
81	Georgetown Univ	23,773	13,489	86
82	Suny at Buffalo	22,788	18,265	68
83	Suny at Stony Brook	22,695	18,240	69
84	Washington State Univ	22,570	13,162	87
85	Emory University	22,351	16,028	78
86	Wayne State Univ	22,261	11,900	92
87	Iowa St U of Sci & Tech	21,963	9,913	98
88	George Washington Univ	21,740	13,608	85
89	Univ of Alaska-Fairbanks	21,687	17,908	70
90	Rockefeller Univ	21,484	19,511	63
Total 1st 90 institutions		4,852,102	3,364,992	
91	Univ of Tex Cancer Center	21,393	20,345	62
92	Brown University	21,102	15,334	80
93	Univ of Vt & St Agric Col	20,518	12,035	89
94	Syracuse University	19,252	10,263	97
95	Univ of Rhode Island	19,092	12,907	88
96	Auburn Univ	18,793	6,315	131
97	New Mexico State Univ	18,679	10,484	96
98	Univ of Oregon Main	18,296	9,311	102
99	Tufts Univ	18,227	9,812	100
100	Oklahoma State Univ	18,211	8,469	113
Total 1st 100 institutions		5,045,665	3,480,267	

[1] Amounts shown represent awards to individual institutions. Awards to the administrative offices of university systems are excluded from totals for individual institutions because that allocation of funds is unknown, but those awards are included in "United States Total."

[2] Data for Johns Hopkins University include $162 million obligated to the Applied Physics Laboratory, considered a federally funded research and development center (FFRDC) until FY 1978.

[3] Data for Pennsylvania State University include $12 million obligated to the Applied Research Laboratory, considered a federally funded research and development center (FFRDC) until FY 1978.

[4] Howard University and Gallaudet College receive substantial appropriations from Congress each year for general operating expenses; their relative rankings thus reflect the magnitude of their nonscience programs.

Academic S/E Activities

Federal support for academic S/E activities grew by 8 percent to $4.8 billion in 1980, a decline of less than 1 percent in real terms. This slight downturn occurred after four years of real growth, averaging 5 percent per year between 1975 and 1979. In 1980, academic S/E programs received 58 percent of total Federal support, down from 68 percent in 1970. This decline reflects the large growth in Federal support for non-S/E programs during the seventies.

RESEARCH AND DEVELOPMENT

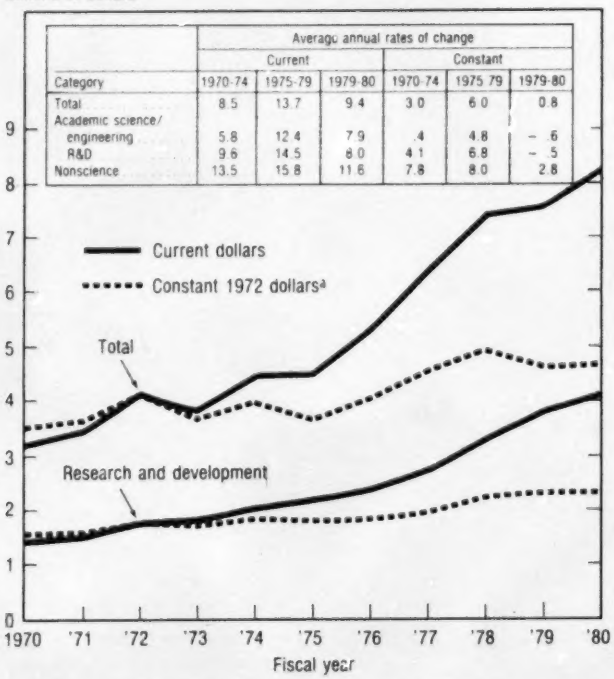
Support from Federal agencies for academic research and development rose by 8 percent from 1979 to 1980 to $4.2 billion, a slight decline in real terms (chart 1). Historically, slightly over one-half of Federal academic R&D support to universities and colleges has been for basic research programs. Federal support for basic research performance in all sectors of the economy grew from 1979 to 1980 by 14 percent to $4.7 billion (or by 5 percent in real terms) with universities accounting for a larger share of the increase (43 percent) than any other sector.[4]

Federal R&D obligations to universities and colleges grew between 1979 and 1980 in five of the seven broad S/E disciplines, at rates ranging from 28 percent for the mathematical/computer sciences to 7 percent in engineering funding. Federal R&D support for psychology and the social sciences, however, fell by 5 percent and 2 percent, respectively, the first decrease in either of these disciplines in four years. When the effects of inflation were taken into account, support for the physical sciences, mathematical/computer sciences, and environmental sciences still showed real-dollar increases for 1980.

Chart 1. Federal obligations to universities and colleges by type of activity

Billions of dollars

	Average annual rates of change					
	Current			Constant		
Category	1970-74	1975-79	1979-80	1970-74	1975-79	1979-80
Total	8.5	13.7	9.4	3.0	6.0	0.8
Academic science/ engineering	5.8	12.4	7.9	.4	4.8	– .6
R&D	9.6	14.5	8.0	4.1	6.8	– .5
Nonscience	13.5	15.8	11.6	7.8	8.0	2.8



[a]Based on GNP implicit price deflator

SOURCE: National Science Foundation

Support for the life sciences, largely from the National Institutes of Health, accounted for slightly over one-half of all Federal academic R&D funding in 1980. Of the remaining R&D support, over one-half was for engineering programs, most of which came from the Department of Defense (DOD), and for the physical sciences, mostly from NSF and the Department of Energy (DOE).

Since R&D awards generally are made on a merit basis, Federal academic R&D funds tended to be more highly concentrated among a relatively few institutions than non-R&D funds. The degree of concentration, however, has been falling. In 1963, at the onset of the survey series, 492 institutions received Federal R&D support, of which the leading 100 R&D-performing universities accounted for 90 percent of all support. In 1980, there were 683 R&D recipients, and the percentage awarded to the leading 100 performers declined to 84 percent. The proportion of total S/E and non-S/E obligations awarded to the top 100 recipients fell considerably more, from 87 percent in 1963 to 60 percent in 1980, an indication of the wide dispersion of non-S/E funds.

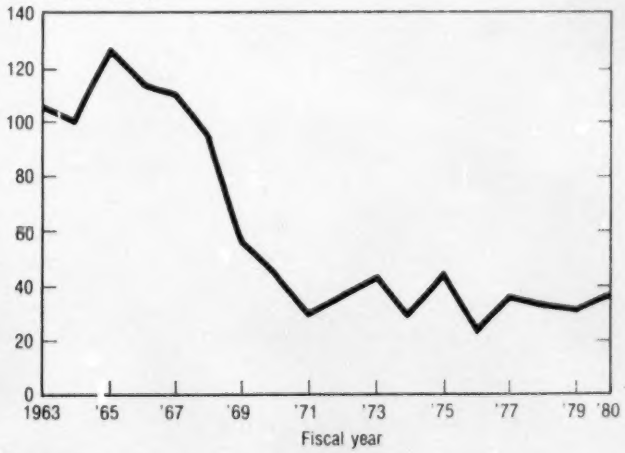
For the third consecutive year, Johns Hopkins University was the leading recipient of all Federal academic funding, and the leading recipient of R&D support. Of the $240 million received by Johns Hopkins for research and development, $162 million supported R&D activities at the Applied Physics Laboratory, provided by the Department of the Navy. MIT, which received $141 million, and Stanford University, $105 million, ranked second and third, respectively, in Federal academic R&D funding. The leading 20 R&D recipients in 1980, as in previous years, accounted for about two-fifths of all Federal academic R&D funds. Sixteen of the leading 20 R&D performers were also included in the top 20 R&D institutions in 1963 when the survey series began.

R&D PLANT

Federal funding for R&D plant at academic institutions reached $38 million in 1980, an 18-percent growth from $32 million in 1979. These funds, however, were far below the 1965 peak level of $126 million. R&D plant funding has declined in 10 of the past 15 years (chart 2).

Chart 2. Federal obligations for R&D plant to universities and colleges

(Millions of dollars)



SOURCE: National Science Foundation

OTHER S/E ACTIVITIES

Federal funding for all S/E activities other than research and development and R&D plant (fellowships, traineeships, and training grants; facilities and equipment for instruction; general support for science/engineering; and all other S/E activities) grew for the fourth consecutive year, this time by 6 percent to $630 million in 1980. Declines in support for facilities and equipment for instruction and for general support between 1979 and 1980 (10 percent and 1 percent, respectively) were more than offset by increases in the two most heavily funded categories—support for fellows and trainees, and for all other S/E activities. Support for these four activities together were funded in 1980 at a level about five-sixths the amount funded in 1971 ($762 million), or less than one-half the constant-dollar level of 1971, when separate data were first available for these activities.

University-Administered Federally Funded Research and Development Centers (FFRDC's)

The 19 FFRDC's administered by universities in 1980 received a 12-percent increase in support for S/E activities. Fifteen of the FFRDC's have been in existence throughout the 1963-80 survey period, and "matched" data for these organizations show that they accounted for nearly all of the 1979-80 increase. The Lawrence Livermore Laboratory, sponsored by DOE, was the leading FFRDC recipient of S/E support ($410 million), followed by DOE's Las Alamos Scientific Laboratory ($364 million). As in 1979, DOE funded three-fourths of all support to academically administered FFRDC's. The four agencies that sponsored university-administered FFRDC's in 1980—DOE, NASA, DOD, NSF—have provided at least 97 percent of all Federal S/E support to these organizations since 1963. The remainder was from agencies that do not sponsor their own FFRDC's.

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The final report, *Federal Support to Universities, Colleges, and Selected Nonprofit Institutions, Fiscal Year 1980*, including statistical tables presenting the survey findings in detail, will be released later in 1982. For more information on the availability of data tapes, call 202-634-4673.

FOOTNOTES

[1] In the absence of a reliable R&D cost index, the GNP implicit price deflator was used to convert current dollars to constant 1972 dollars. The GNP deflator can only indicate approximate changes in costs of R&D performance.

[2] National Science Foundation, *Federal Funds for Research and Development, Fiscal Years 1980, 1981 and 1982*, Volume XXX (Detailed Statistical Tables) (NSF 80-325) (Washington, D.C.), table C-1.

[3] Previously published totals for FY 1979 have been revised from $6.2 billion to $7.6 billion to reflect corrections submitted by the Department of Education for its non-S/E obligations.

[4] National Science Foundation, *Federal Funds for Research and Development, op cit.*, table C-1, and *Fiscal Years 1979, 1980, and 1981*, Volume XXIX (Detailed Statistical Tables) (NSF 80-318) (Washington, D.C.), table C-1.

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